There is, however, one outlet which believers in this law can take advantage of, namely, that perhaps the new body was originally part of the planet which, when broken up, gave rise to the group of minor planets. As opinion is still divided as to the true origin of asteroids, namely, whether they are the result of a large series of explosions of an original planet which revolved between Mars and Jupiter; whether they are the condensation of matter which originally was distributed in rings like Saturn, but which was disturbed by the action of Jupiter; or, lastly, whether they are the result of tidal action on the tenuous primitive masses, the presence of the new planet in this exceptional orbit might be accounted for on any of these hypotheses. Perhaps, for all we know, this planet may be one of several similar bodies which were so thrown off or perturbated from the original mass, that they were able to get into more favourable positions for being disturbed by the attraction of Mars when nearest them, and that their orbits were changed.

Mr. Rees, in a lecture before the New York Academy in 1897, suggested that "the very rapid augmentation in the number of minor planets indicates that there may be thousands or even millions in the zone: with more powerful telescopes and more sensitive plates we may hope to find many of these thousands. And perhaps the same agencies will discover asteroids between the orbits of all the planets." There is, however, no doubt that the orbits of some of the minor planets are not very dissimilar from those of Mars and Jupiter, and must be subjected at times to large disturbing forces by both these planets. That one, or even several, of these bodies may have been violently disturbed by Mars when in a very favourable position, and thus made to revolve in orbits more eccentric and inside that of Mars, does not seem at all improbable.

Jupiter also would be responsible for a great disturbing force, and it is as likely as not that beyond his orbit many of these small bodies pursue their paths; these, however, would probably be invisible to us on account of the greater distance. In fact, it seems more natural and in harmony with the solar system in general to consider this newly-discovered small planet as an unusually situated member of the minor planet group, than as a single condensed body which has from the beginning of its career been up till now an unseen major planet.

If future research on the movement of this new body should indicate the probability that we are dealing with a member of the minor planet group that has suffered considerable perturbations, then the law of Bode will, with the ususal exception (Neptune), still afford us the simple approximate means of quickly calculating the distances of the members of the solar system.

WILLIAM J. S. LOCKYER.

NOTES.

WE regret to see the announcement of the death of Mr. Latimer Clark, F.R.S., the well-known electrician, at the age of seventy-six.

PROF. JAMES A. CRAIG, of the University of Michigan, spent his summer vacation in London at work in the British Museum, on the astrological-astronomical tablets of the Kujundjik (Nineveh) collection known as the Illumination of Bêl. This is the most important series of unedited texts in the British Museum, and by far the most important in many respects to be found in any of the collections extant. Prof. Craig has worked upon it during the last three summer vacations, and has now completed all the texts of the series, which number about 130 tablets. His manuscript is already in the press with Die Hinrichssche Buchandlung, Leipzig, and will appear shortly in the "Assyriologische Bibliothek," in which the author has already published two volumes.

THE Paris correspondent of the *Chemist and Druggist* states that Dr. Calmette, Directeur of the Pasteur Institute at Lille, has endowed that body with a sum of 250,000 francs (10,000*l.*), representing the profits realised by the distilleries at Seclin by one of his inventions.

Natural Science, the impending decease of which was announced in the October number, has received a new lease of life. An editor has been found willing to take upon himself the burden of responsibility, so the journal will appear as heretofore during 1899, and, it is hoped, for many years to come.

THE Committee on endowment of the Franklin Institute, Philadelphia, is making an appeal for subscriptions to the endowment fund. It is of the utmost importance for the future prosperity and progress of the Institute, that a substantial addition to its annual revenues be acquired, not only to provide income sufficient to carry on its present work, but also to enable it to extend this in other directions.

PROF. ISRAEL C. RUSSELL, of the department of geology of the University of Michigan, has recently conducted a geological survey for the United States Government over the northern portion of the Cascade Mountains. The greater part of the work was in Washington State, and extended from the Northern Pacific railroad to the Canadian boundary, crossing the mountains several times. Among the places of interest visited was Glacial Peak, the height of which was verified.

AT the close of the last, and the beginning of the present week, the weather over these islands was of a very unsettled character. On Saturday, October 29, a cyclonic disturbance appeared off the south of Ireland, and subsequently passed to the Shetlands, causing gales, especially over the western and northern parts of the country, and rough weather in the Channel and Bay of Biscay, with very heavy rainfall generally, amounting in forty-eight hours to 1·26 inches at Greenwich and 2·48 inches at Pembroke, while thunder and lightning were observed at several places. At Camberwell Green (south-east London) a terrific squall, resembling a small tornado in its character, occurred at about 9h. 30m. on Saturday evening, overturning vehicles, uprooting trees, and causing much damage to buildings. The violence of the storm, the track of which was apparently from about E.S.E. to W.N.W., fortunately lasted only a few minutes, and was confined to a very small area, other places in the immediate locality experiencing nothing beyond strong wind accompanied by very heavy rainfall.

THE ordinary general meeting of the members of the Institution of Mechanical Engineers was held on October 26 and 27, Mr. Samuel W. Johnson, the president, being in the chair. The president announced that Sir W. H. White, Chief Constructor of the Royal Navy, had been nominated as his successor, Mr. T. Hurry Riches as a vice-president, and Sir William Arrol, M.P., Sir Benjamin Baker, Mr. Henry Chapman, Mr. W. J. Pirrie, and Sir T. Richardson, M.P., as members of the Council. In a paper on "Electric installations for lighting and power on the Midland Railway, with notes on power absorbed by shafting and belting," Mr. W. E. Langdon showed that an extensive loss of power takes place in shafting and belting, but this may be reduced by driving each tool or machine direct from an electric motor. With large tools or machines absorbing over one horse-power, there seems to be no question of the advantage derived from driving them direct by electricity. Mr. W. M. Smith described some recent practical experience with express locomotive engines. The train resistance was found to be considerably increased by side winds. On one trip it was found that the side wind increased the mean train resistance by about 3·558 lbs. per ton of load. The dynamometer apparatus used in the experiments measured and recorded (1) the pull or push exerted by the engine on the train; (2) the distance run; (3) the speed; (4) the places of starts, stops, and stations; and (5) the time when starts and stops were made, and when stations were passed. The horse-power shown by the indicator diagrams differed from that recorded by the dynamometer, which was in a separate car. Usually, however, the ratio between the two horse-powers did not vary much. On an average the dynamometer horse-power was equal to approximately 64 per cent. of the indicated horse-power. Thus about 36 per cent. of the driving power was absorbed by the engine and tender.

MR. N. R. HARRINGTON and Dr. Reid Hunt have arrived in New York from the Nile valley, where they have been several months collecting *Polypterus* and other interesting and valuable cytological material. We learn from *Science* that the chief object of the expedition was to procure the life-history of *Polypterus* and its bearings upon the problem of the relation of the Crossopterygian fishes to the Amphibia. In the last few years the former theory that Amphibia sprang from Dipnoan fishes has gradually given way to the present view that *Dipnoi* are to be regarded as parallel to Amphibia from a common Crossopterygian origin. Several very successful expeditions have been sent out to procure material for the embryology of Dipnoans, notably that of Prof. Richard Semon from Jena, and that of Mr. Graham Kerr from the University of Cambridge. The former secured the complete life-history of *Ceratodus*, and the latter brought back the embryology and complete life-history of *Lepidosiren*, a South American form. But before the recent expedition nothing had been done upon the development of *Polypterus*, because of the exceptional difficulties which stood in the way of procuring material. Messrs. Harrington and Reid found that the fish did not occur in Lake Menzaleh during the low Nile period, but they came across several *Polypterus* near Ras-el-Ghelig. The best *Polypterus* fishing ground, not closed on account of the Sudan campaign, was at Mansourah, forty miles from the sea; and the party settled there for the summer.

THE attention of botanists has of late years been turned to the biology of ferns, but there still remain a great many facts to be explained, and questions to be solved. Dr. Aurelio de Gasparis, in a paper to be published in the *Atti* of the Naples Academy, has brought to light a large number of new facts relating to ferns. Some of these relate to certain forms of dissemination not previously observed, others to the trophilegic action of the fronds, in connection with which certain arrangements have been observed, destined to facilitate the passage of water to the roots. The author has also discovered two new cases of myrmecophily, as well as a number of cases of acarophily among ferns, many of them very evident and easy of observation.

AN interesting addition to the list of myrmecophilous plants furnished with so-called "extra-nuptial" nectaries is given by Prof. Federico Delpino in the *Rendiconto* of the Naples Academy, iv. 7. In the Botanical Gardens at Naples about seven or eight plants have recently been observed to possess these glands, which differ from the ordinary melliferous glands in not being associated with the floral organs and being provided for the purpose of attracting ants instead of for promoting fertilisation. The newly-observed cases occur in *Cardamine cheledonia*, L., *Lilium croceum*, L., *Dyckia regalis* and *D. remotiflora*, a species of *Aechmea*, *Iris foetidissima*, L., and *Vicia serratifolia*, Koch. The families of *Cruciferae* and *Bromeliaceae* are thus added to the fifty-eight families previously known to contain species furnished with the glands in question.

IN a paper, published in the *Sitzungsberichte* of the Berlin Academy of Sciences, Dr. F. Johow states his belief that the number of flowers pollinated by the agency of birds is much smaller than is often stated. Humming-birds, in particular, since they feed entirely on insects, and not on nectar, play but a small part in the carriage of pollen. He describes, however, an unquestionably ornithophilous flower in a Chilian Bromeliad, *Paya chilensis*. The "nectar" in this flower is exceedingly abundant, but is not attractive to insects, being very watery, and containing but little sugar. It is, however, eagerly drunk by humming-birds, but more especially by the "Chilian starling," *Curaeus aterrimuus*; and these birds get their heads plentifully besprinkled with the pollen, which they then carry to other flowers.

PROF. RAMSAY has an article on the kinetic theory of gases and some of its consequences in the November *Contemporary*. He explains Dr. Johnstone Stoney's application of the kinetic theory to the atmospheres of planets and satellites, and then considers the recent discoveries of gaseous constituents of our own atmosphere, with special reference to the new element "neon." The facts dealt with are summed up as follows: "We have seen, then, that the discovery by Lord Rayleigh of a discrepancy in the density of atmospheric nitrogen has resulted in the discovery of a new constituent of air, argon; its discovery has led to that of a constituent of the solar atmosphere, helium; speculations on the ultimate nature and motion of the particles of which it is believed that gases consist has provoked the consideration of the conditions necessary in order that planets and satellites may retain an atmosphere, and of the nature of that atmosphere; the necessary existence of an undiscovered element was foreseen, owing to the usual regularity in the distribution of the atomic weights of elements not being attained in the case of helium and argon; and the source of neon was therefore indicated. This source, atmospheric air, was investigated, and the missing element was discovered."

THE expressions for the work done in magnetising a body have been given by Mascart and Joubert and Prof. J. J. Thomson, by Prof. Ewing, and by Prof. Ascoli respectively in three different forms, all of which lead to the same results when applied to closed cycles, but differ in the values they give for the work done in an open transformation. An interesting examination of these formulæ is given by Signor Guido Grassi in the *Rendiconto* of the Naples Academy, vi. 7. The author finds that Ewing's formula $(1/4\pi)\int H dB$ represents the general expression of the total work of magnetisation; that $\int H dI$ represents the difference between the total work of magnetisation and the work which would have to be expended in order to create the magnetic field if the latter did not contain any bodies of magnetic permeability different to that of air; and that the expression $\int I dH$ does not represent the work of magnetisation except in the case of a closed cycle.

PROF. B. O. PEIRCE and Mr. R. W. Willson have for several years been engaged in an attempt to measure, by the aid of the "Wall method," the thermal conductivities of certain relatively poor conductors, and the variations of these conductivities with the temperature. The methods they have adopted, and the results of a number of observations, are now published in the *Proceedings* of the American Academy of Arts and Sciences (vol. xxxiv. No. 1, August 1898). In the present paper the results are given of determinations of conductivities of about twenty specimens of marble of different kinds, when the faces of slabs of the material are kept at temperatures of about 18° C., and 45° C., compared with the conductivity of a special brand of glass which appeared to be practically constant within the limits of the measurements. It appears that the conductivity of a specimen of marble at ordinary mean temperatures may depend, to the amount of several per cent., as

Messrs. Hershell and Lebour have shown, upon the amount of moisture which the specimen holds. An accuracy of only one per cent. is therefore claimed for the determinations. The absolute conductivities of the marbles, calculated on the assumption that the conductivity of the standard glass was 0·00277, are between 0·00501 and 0·00761. Special attention is drawn to two groups of fine-grained marbles, which have conductivities of about 0·0068 and 0·0076 respectively, at about 30° C.

THE principal facts referring to the origin of the metamorphosis of insects are summarised by Mr. J. W. Tutt in the volume of *Transactions* just issued by the South-Eastern Union of Scientific Societies (Taylor and Francis). Metamorphosis, he concludes, appears to be an adaptive habit which certain insects have adopted, in their struggle for existence against those enemies by which they are everywhere surrounded, and against those animals that compete against them for food. The habit of flying, by which they are able to escape from numberless enemies that have not this power, was probably one of the first factors in their development that led to their ultimate success. The additional ability to store up food in the early active (larval) stages of their existence so as to allow them to adopt a hiding habit and quiescent external form at the most critical period of life, must, however, have been the proximate cause of that success which has culminated in their being numerically the most successful types of terrestrial life in existence, the number of species being almost incredible.

WRITING with reference to the account of the resuscitation of a toad taken from a snake, which appeared in NATURE of August 11 (p. 344), a correspondent in the Purneah district, India, informs us that similar occurrences are common in parts of India. He remarks:—"Almost any snake can be made to disgorge what he has just eaten if worried a bit, and on numberless occasions I have seen this done with grass snakes, and seen a toad or frog, generally the latter, hop away rejoicing.... Snakes when angry or alarmed apparently have the power of throwing up their food, and only the other day I caught a 'dhamin,' a harmless but very savage snake—a small one, about 40 inches long—and put him in a box with a glass lid. The next morning I found two half-digested rats which the snake had thrown up. The same thing happened once with a black cobra, whose meal had also consisted of two rats with the addition of a sparrow."

A VOLUME of *Transactions and Proceedings* (vol. xxx., 1897) of the New Zealand Institute, edited and published under the authority of the Board of Governors of the Institute by Sir James Hector, K.C.M.G., F.R.S., has been received. Several of the papers in it have already been referred to; and the limitations of available space prevent us from referring to more of the present volume than a presidential address by Mr. W. T. L. Travers on material and scientific progress in New Zealand during the Victorian Era. Sir James Hector's work in New Zealand justly entitles him to distinction among the explorers and discoverers who have advanced the knowledge of the physical characteristics of the globe during the past sixty years. He commenced his duties as geologist to the Provincial Government of Otago in 1861, and under his direction very valuable investigations were made. Mr. Travers points out, however, that geological work in the field practically ceased in 1893, since which date Sir James Hector has not been provided with the necessary staff for pursuing it. Why this is the case is not clear, but the interruption in the work of one of the most important scientific departments of the Colony is much to be regretted.

REFERRING to the biological interests of the islands of New Zealand, Mr. Travers remarks, in the address referred to, that though the reptilian life found is very limited in extent, it contains two forms of the most remarkable character—namely, the *Tuatara* lizard and a frog known as *Leiopelma hochstetteri*, found chiefly in the Coromandel district. The lizard is only now found in some of the outlying islands, where its continued existence is threatened by the introduction of the pig and the cat. The affinities and structure of this reptile have been the subject of many memoirs, both by New Zealand and foreign naturalists, who have shown that it is evidently connected with some of the most ancient fossil forms. The frog is remarkable chiefly as occurring in an oceanic island. It is satisfactory to know that the fauna and flora of New Zealand have been, and are, studied by many collectors and investigators, the results of whose work have been embodied either in separate volumes or manuals published by the Government under the editorship of Sir James Hector, or in the shape of memoirs in the *Transactions* of the New Zealand Institute, such as those in the volume lately issued.

THE age of Niagara Falls, as indicated by the erosion at the mouth of the gorge, was the subject of a paper by Prof. G. Frederick Wright, read at the recent Boston meeting of the American Association. The late Dr. James Hall early noted the significant fact that "the outlet of the chasm below Niagara Falls is scarcely wider than elsewhere along its course." This is important evidence of the late date of its origin, and it has been used in support of the short estimates which have been made concerning the length of time separating us from the Glacial period. A close examination made by Prof. Wright this summer greatly strengthens the force of the argument, since he found that the disintegrating forces tending to enlarge the outlet and give it a V-shape are more rapid than has been supposed. As the result of his investigations, he concludes that a conservative estimate of the rate of disintegration for the 70 feet of Niagara shales supporting the Niagara limestone would be one inch a year, with a probable rate of two inches a year. But at the lowest estimate no more than 12,000 years would be required for the enlargement of the upper part of the mouth of the gorge 1000 feet on each side, which is very largely in excess of the actual amount of enlargement. Some of the recent estimates, therefore, which would make the gorge from 30,000 to 40,000 years old, are regarded as extravagant. According to Prof. Wright, the age of the gorge cannot be much more than 10,000 years, and is probably considerably less.

DR. AD. STRÜCK, of Salonica, contributes an interesting paper on the Macedonian Plain to the issue of *Die Natur* for October 9. Some details of the mean temperature and rainfall are given, and a short account of the chief products of the region.

THE *Bollettino* of the Italian Geographical Society for October contains a paper, by M. Baratta, on the geographical distribution of earthquakes in Umbria. All the authentic records in existence are summarised and discussed, and a map showing the chief regions of seismic disturbance is appended.

WE have received a copy of the double number of *Spelunca*, the organ of the French *Société de Spéléologie*, for the first half of the current year. This journal is now in the fourth year of its existence, and it continues to publish valuable papers on subjects connected with caves and other subterranean structures. The present number contains some notes of interest on the protection of sources of potable water, indicative of increased attention to this matter in France.

A PAPER, by Prof. Dr. J. Walther, on historical and geological aspects of the problem of the course of the Oxus, appears in *Petermann's Mittheilungen*. Dr. Walther shows that the Oxus has always flowed into the Sea of Aral, and that the belief that its waters reached the Caspian arose from ignorance of the existence of the Sea of Aral, and from the credit given to the fanciful reports of the English merchant Jenkinson, who travelled from Astrakhan to Bukhara in 1558.

A COPY of the general report of the work carried on by the Geological Survey of India for the period from January 1, 1897, to April 1, 1898, has been received. The headquarter notes, forming the first part, announce amongst other things the removal of the offices of the department to a new building which affords improved accommodation, but the Director pleads for transference of headquarters to a hill station. The second half of the report gives short accounts of nine separate surveying expeditions, including one on the north-west frontier by Mr. H. H. Hayden, who was permitted to accompany the Tirah Expeditionary Force.

THE September number of the *National Geographic Magazine* contains papers on the growth of the United States, by W. J. McGee; on the Bitter Root Forest Reserve, by Richard U. Goode; on Atlantic Estuarine tides, by M. S. W. Jefferson; and on the forest conditions of the State of Washington, by Henry Gannett. Mr. McGee's paper traces the growth of the States in area, population, wealth, railway-mileage, and carrying trade since 1790, and shows that the history of the growth of the United States is one of unequalled progress in all these elements, but, above all, in "development of a national character in which individual enterprise and capacity are the most conspicuous traits."

FOUR new parts of the second edition, revised, of "An Illustrated Manual of British Birds," by Mr. Howard Saunders, have been received from Messrs. Gurney and Jackson. Twelve parts of the work have now been published, and eight more have yet to appear to complete the work.

A RICHLY illustrated book for nature lovers is "An Elementary Botany" by Prof. George F. Atkinson, of Cornell University, announced for early publication by Messrs. Henry Holt and Co. Among the more than five hundred pictures are many full-page landscapes in half-tone.

MESSRS. ARCHIBALD CONSTABLE AND CO. will publish, early in November, "The Life of the late Sir Charles Tilston Bright, C.E., M.P.," wherein is included the story of the first Atlantic cable, the first telegraph to India and the Colonies, and the early land telegraphs of the United Kingdom. This work is written by Mr. E. B. Bright and Mr. Charles Bright, brother and son respectively of the subject of the memoir. The book, which contains many full-page and text illustrations, as well as photogravure plates, maps, charts, &c., will be published in two volumes.

UNDER the title of *Sell's Commercial Intelligence* a weekly newspaper has been started with the object of publishing authentic commercial intelligence, and developing British trade. The periodical will do a useful service to British industry if it will show our manufacturers how technical education and scientific research abroad have enabled other nations to beat us in the markets of the world. The following note on a decrease in the exports of chemicals is interesting in this connection :—"The American Consul at Liverpool points out that the exportation of chemicals from the Liverpool districts to the United States, has fallen from about nine million dollars in 1891 to a little under four million dollars in 1897, and at the present rate the exportations for 1898 will only amount to about a quarter of a million dollars. He comments on the application of electrolysis to chemical manufactures, and points out that where electricity can be produced by water-power, as at Niagara and many other places in the United States, the new process will have a better chance of success than in England." We are glad to see that a series of equivalents of British and metric measures is commenced in the new journal.

THE additions to the Zoological Society's Gardens during the past week include a Drill (*Cynocephalus leucophaeus*) from West Africa, presented by Mr. Alfred J. Dempster; two Wild Canaries (*Serinus canarius*) from the Canary Islands, presented by Mr. W. H. S. Quintin; two Tarantula Spiders (*Mygale*, sp. inc.) from the West Indies, presented by Mr. H. R. Taylor; a Common Hamster (*Cricetus frumentarius*), European; a Matamata Terrapin (*Chelys fimbriata*) from Brazil, deposited; a Blue Jay (*Cyanocitta cristata*) from North America, a Naked-throated Bell-bird (*Chasmorhynchus nudicollis*) from Brazil, a Common Boa (*Boa constrictor*) from South America, purchased; two Cockateels (*Calopsitta novae-hollandiae*), a Graceful Ground Dove (*Geopelia cuneata*), a Spotted Turtle Dove (*Turtur suratensis*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

NEW ALGOL VARIABLE.—A Kiel Circular (No. 14) tells us that Mr. Sawyer has discovered a new variable of the Algol type + 12° 3557. Its period is very short, amounting to 0·89 days; the change in magnitude during this interval being 7·0 to 7·5. A minimum occurred on October 3·54 last, Greenwich mean time.

COMET BROOKS.—Kiel Circulars Nos. 13 and 14 give the elements of this comet as computed by Ristenpart and Möller on the one hand, and Hussey on the other. Those of the latter were computed from observations made on October 21, 23 and 25, and are as follows :—

T = 1898 November 23·14 Greenwich M.T.

$$\left.\begin{array}{rcrr} & & {}^{\circ} & {}' \\ \omega & = & 123 & 22 \\ \Omega & = & 96 & 10 \\ i & = & 140 & 19 \end{array}\right\} 1898{\cdot}0$$

$$q = 0{\cdot}7564$$

The ephemeris which accompanies these elements is only computed up to November 8, so we give below the position of the comet on that day for Greenwich midnight.

R.A. = 17h. 44m. 52s. Dec. = + 12° 41′.

The comet is rapidly decreasing in declination, and will be found in the region south of λ and δ Herculis, moving in the direction but slightly to the west of α Ophiuchi.

The Circular further states that the orbit of this new comet is similar to that of Comet 1881 IV. This latter was discovered by Schaeberle, and was visible to the naked eye for more than two weeks in August, its tail being over 10° long on August 21. Telescopically it was visible for a period of fourteen weeks.

THE ORBIT OF CASTOR.—Prof. Doberck, of the Hong Kong Observatory, has recently been investigating the elements of the orbit of Castor, or α Geminorum, as the components seem to have been behaving rather differently from what computation has destined them. The orbit, which was calculated in 1877, seems to have been entirely upset by the fact that since 1887 the components have been steadily approaching each other. With the assistance of Mr. J. I. Plummer, Prof. Doberck has collected all available observations and compared them with computed elements (*Astr. Nachr.*, 2168). From this he has formed the normal places, which have led him to obtain the following elements referred to the year 1900 :—

$$\begin{array}{lll} \Omega = 33^{\circ}\ 0' & \qquad & e = 0{\cdot}5909 \\ \gamma = 69\ \ 34 & & P = 318{\cdot}23 \text{ years} \\ \lambda = 87\ \ 14 & & T = 1948{\cdot}86 \end{array}$$

$$a = 6''{\cdot}605$$

From these Prof. Doberck has calculated an ephemeris for the apparent places for the years 1900–1920, from which we make the following extract :—

t.	Pos. angles θ	Dist. ζ	$\Delta\alpha$	$\Delta\delta$
	°	″	s	″
1900	225·65	5·644	−0·310	−4·04
1901	225·22	5·625	−0·312	−4·00
1902	224·78	5·603	−0·313	−3·95
1903	224·34	5·579	−0·314	−3·90
1904	223·89	5·554	−0·315	−3·85
1905	223·44	5·527	−0·315	−3·80